FACTSHEET

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Title:Disease-Resistant Apple Cultivars

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Introduction

There are several insects and diseases that can attack apples grown in Ontario. Apple producers must exercise some control over these problems or fruit losses may be excessive and economic production not possible.

Several cultivars are now available which have high resistance or field immunity to apple scab. Table 1 is a partial list of available scab resistant apple cultivars, and additional selections are presently being developed. Some of these cultivars also have resistance to other diseases (Table 2).

Table 1: Scab Resistant Apple Cultivars

Cultivar	Year Released	Originated
Belmac	1996	AAFC, St. Jean, PQ
Britegold	1980	Agriculture Canada, SEF
Dayton	1987	PRI
Enterprise	1993	PRI
Freedom	1983	NYSAES, NY
Florina (Querina®)	1977	INRA, France
Goldrush	1993	PRI
Jonafree	1979	PRI
Liberty	1978	NYSAES, NY
Macfree	1974	Agriculture Canada, SEF
McShay	1988	Oregon State, Purdue & Illinois Universities
Moira	1978	Agriculture Canada, SEF
Murray	1980	Agriculture Canada, SEF
Nova Easygro	1971	Agriculture Canada, Kentville, NS
Novamac	1978	Agriculture Canada, Kentville, NS
Novaspy	1986	Agriculture Canada, Kentville, NS
Prima	1970	PRI
Primevère	1997	AAFC, St. Jean, PQ & PRI
Priscilla	1972	PRI
Pristine™	1994	PRI
Redfree	1981	PRI
Richelieu	1983	Agriculture Canada, St. Jean, PQ
Rouville	1983	Agriculture Canada, St. Jean, PQ
Sir Prize	1975	PRI
Trent	1979	Agriculture Canada, SEF
William's Pride	1988	PRI

- PRI - Cooperative introductions from the State Universities in Purdue, Rutgers and Illinois.
- AAFC, St. Jean, PQ - Agriculture and Agri-Food Canada, St. Jean sur Richelieu, PQ
- Agriculture Canada, SEF - Smithfield Experimental Farm, Trenton, ON (closed)
- NYSAES, NY - New York State Agriculture Experimental Station, Geneva, NY
- INRA, France - Institute National de la Recherche Agronomique, Angers, France

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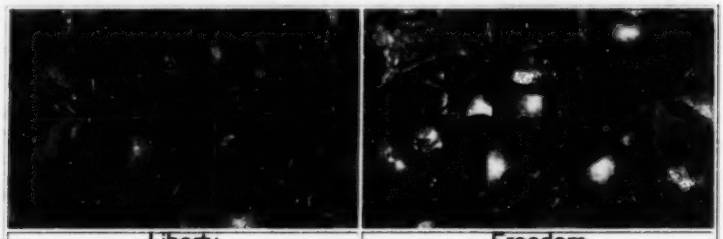
Apple scab caused by *Venturia inaequalis* (Cke.) Wint., is the most serious disease affecting apples. Growing cultivars resistant to apple scab eliminates the need for control of this fungal disease. Apple scab is not the only disease that can hamper apple production in Ontario. Powdery mildew incited by *Podosphaera leucotricha* (Ell. & Ev.) Salm, and the bacterial disease, fire blight incited by *Erwinia amylovora* (Burr.) are also of major concern.

Cultivars with resistance to the major early season diseases (apple scab, fire blight, powdery mildew, cedar apple rust) are now under development and a few which are moderately or highly resistant to these diseases have been released. However, combining resistance to several diseases in a new apple cultivar, as well as maintaining desirable fruit characteristics, has been a formidable task. The level of reported disease resistance and the quality of the fruit produced for disease resistant cultivars in outlined in Table 2.

Resistance to other, less prevalent diseases, has not been included in disease resistance breeding programs. Susceptibility of the cultivars listed here to such problems as black rot, sooty blotch, fly speck, quince rust and other diseases remains largely undetermined. Such diseases might limit the adaptablility of otherwise disease resistant cultivars in some locations if no fungicide sprays are applied.

Before a large planting of disease resistant apples is attempted, disease resistance, fruit quality, and most importantly, market acceptability should be evaluated under a grower's own set of circumstances. Because of the wide range of growing conditions in Ontario apple districts, the best way to evaluate these cultivars is to establish your own small planting including those cultivars of interest.



Liberty | Freedom

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Table 2: Selected cultivars with demonstrated field resistance to the diseases listed. Not all cultivars listed have been evaluated in Ontario. Where this is the case the information given is taken from the originating source.

Disease Resistance Ratings

R - resistant (no control necessary)
MR - moderately resistant (control may be necessary under severe disease pressure)
S - susceptible (control necessary in growing areas where the disease is prevalent)
U - unknown
Storage - months in refrigerated storage at 1° C.
Best use - **processing:** juice, sauce or pie fill
- **dessert:** fresh fruit
- **dual:** combined use

Harvest Date - observed or estimated under Ontario conditions

Cultivar	Apple Scab	Powdery Mildew	Fire Blight	Cedar Apple Rust	Quince Rust	Best Use	Harvest Season	Storage (months)
Belmac	R	MR	U	U	U	dessert	late Sept.	3 - 4
Britegold	R	R	R	S	S	dessert	mid Sept.	1 - 2
Dayton	R	MR	MR	S	S	dessert	early to mid Sept.	1
Enterprise	R	MR	R	R	U	dessert	mid Oct.	6
Freedom	R	MR	R	MR	U	dual	early Oct.	1 - 2
Florina (Querina®)	R	U	MR	U	U	dessert	U	U
Goldrush	R	MR	MR	S	U	dessert	late Oct.	5 - 6
Jonafree	R	MR	MR	S	MR	dessert	early Oct.	2 - 3
Liberty	R	R	R	R	MR	dessert	late Sept.	4 - 5
Macfree	R	MR	MR	R	S	dual	early Oct.	2 - 3
McShay	R	S	U	U	U	dessert	mid Sept.	2 - 3
Moira	R	S	S	R	S	dual	early Oct.	2 - 3
Murray	R	R	MR	R	S	dessert	late Aug.	< 1
Nova Easygro	R	R	MR	R	S	dessert	late Sept.	2 - 3
Novamac	R	MR	U	R	S	dessert	early Sept.	3 - 4
Novaspy	R	MR	U	S	S	dual	mid Oct.	4 - 5
Prima	R	MR	MR	S	S	dual	mid Sept.	1
Primavère	R	U	U	S	S	dessert	mid Oct.	6
Priscilla	R	R	R	R	S	dual	early Oct.	2
Pristine™	R	R	MR	S	U	dessert	early Aug.	1
Redfree	R	MR	MR	R	MR	dessert	late Aug.	1 - 2
Richelieu	R	U	U	S	S	dual	early Sept.	2 - 3
Rouville	R	U	U	U	U	process	early Sept.	2
Sir Prize	R	MR	MR	S	S	dual	early Oct.	2 - 3
Trent	R	MR	MR	R	S	dual	late Oct.	6
William's Pride	R	MR	MR	R	S	dessert	mid Aug.	1 - 1.5

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Cultivar	Brief Description of Major Attributes
Belmac	Resembles McIntosh, skin smooth and glossy with up to 90% red, slightly stripped over a green background colour. Flesh is white, medium to coarse texture, mild sub-acid. Cold hardy.
Britegold	Yellow, medium to large size, sweet, flesh creamy yellow, slightly coarse, tender, and juicy. Bruises easily. Home garden use.

Dayton	80 - 90% attractive glossy red over yellow background colour. Flesh pale yellow, crisp, juicy, firm, fine grained, and moderately acid. Home garden use.
Enterprise	Medium fruit size, washed 80 - 100% medium red on a very bright and glossy green-yellow ground colour. FLesh is fine grained, pale yellow to cream coloured, firm, crisp, sub-acid. Has potential as a commercial cultivar.
Freedom	80% red strips on a yellow background, large size. Flesh is creamy, juicy, firm, medium fine grained, tender and moderately acid. Has potential as a commercial cultivar.
Florina (Querina®)	Fruit 50% red on yellow ground colour, firm, small to medium size, sweet flavour. Whitish-yellow flesh, very crisp, low acid. Deserves further evaluation.
Goldrush	Fruit medium size, greenish-yellow to red blush at harvest, becoming entirely deep yellow in storage. Flesh is medium coarse grained, firm, crisp, pale yellow and non-browning. Flavour is complex, spicy and slightly acid at harvest.
Jonafree	90 - 95% red, medium-sized with pale yellow flesh. Crisp, juicy, very firm, fine grained, mildly acid and pleasant aroma. Has potential as a commercial cultivar.
Liberty	90% dark red with a yellowish background colour. Somewhat striped, moderately acid, flavour good. Flesh is yellowish, juicy, crisp, and fine textured. Has potential as a commercial cultivar.
Macfree	75% medium red over greenish-yellow background, medium to small size. Flesh is juicy, white with a slight green tinge. Firm, moderately coarse, pleasant, moderately acid. Medium eating quality.
McShay	70% dark red blush over a green background colour, similar to McIntosh. Flesh, moderately firm, fine texture, juicy, mild flavour and low acid.
Moira	Red, medium to small size, flesh creamy white with a green tinge. Medium eating quality.
Murray	Red, medium sized, flesh is soft, juicy, white and fine textured. Home garden use.
Nova Easygro	Striped or washed, medium red over a green-yellow background. Medium sized, flesh is creamy white, moderately fine, firm, crisp, moderately juicy, and low acid. Home garden use.
Novamac	Fruit medium size, 50 - 90% blushed or striped medium red with a greenish-yellow background. FLesh is creamy white, fine, tender, moderately crisp, juicy, and moderately acid. Similar to McIntosh. Has potential as a commercial cultivar.
Novaspy	Similar to Northern Spy, greenish yellow striped or blushed with dark red. Flesh creamy yellow, fine, very firm, crisp, moderately tender, juicy and moderately acid. Has potential as a commercial cultivar.
Prima	60 - 80% bright red blush over a yellow background. Flesh is moderately acid, medium grained, crisp, and juicy. Tree lacks winter hardiness. Home garden use.
Primavère	Fruit bright and glossy dark cardinal red, slightly conical. Flesh is moderately coarse grained, pale green to white, firm, crisp. Has commercial potential.
Priscilla	70 - 90% bright red blush over a light yellow background. Flesh is crisp, medium grained, juicy, mild flavour and low acid. Fruit size can be small. Home garden use.
Pristine™	Fruit medium size, pale green-yellow at harvest, maturing to deep yellow, with moderate orange blush. Flesh is pale yellow, crisp, medium to fine grained, medium acid to sweet.
Redfree	80 - 90% glossy medium red on a yellow background. Flesh is firm, light cream, medium grained, crisp, juicy, mild flavour, low acid. Uneven ripening. Has potential as a commercial cultivar for late August to early September.

Richelieu	Fruit 50 - 60% medium red, striped over green to light yellow ground colour, medium in size. Flesh white, tender, juicy, fine texture, mild to sub-acid.
Rouville	Fruit large, 75 - 80% medium red, lightly striped, over pale green to yellow ground colour. Flesh is white, tender, slightly coarse, and sub-acid.
Sir Prize	Yellow, can have a slight red blush, can russet. Large, bruises easily, flesh is juicy, crisp, and very tender. Poor pollenizer. Home garden use.
Trent	Red, medium to large in size. Flesh is firm, juicy, cream coloured with greenish tinge, and slightly coarse. Prone to bitter pit.
William's Pride	Moderately bright dark red on green-yellow or pale yellow background. Medium to large size, flesh is light cream, medium grained, mildly acid, very crisp and firm. Multiple pickings required. Home garden use.

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